REMARKS

Claims 1, 4, 5 and 8-10 are currently pending. Claims 2, 3, 6 and 7 have been canceled, and Claims 1, 4, 5 and 8-10 have been amended. No new matter has been entered.

Claims 1-10 were previously rejected. Based on the following remarks, it is believed that all claims of the present application are in condition for allowance and a notice to that affect is respectfully requested.

I. 102(e) Rejection Based on Dyer

Claims 1-10 were rejected under 35 U.S.C. §102(e) as being unpatentable over U.S. Patent No. 6,337,684 to Dyer. In response, Claims 1, 4, 5 and 8-10 have been amended, while Claims 2, 3, 6 and 7 have been canceled. Based on the following remarks, Applicants believe that amended Claims 1, 4, 5 and 8-10 of the present application are allowable over the cited prior art of Dyer.

A. The Invention According to Independent Claim 1

The invention according to independent Claim 1, as amended, calls for a method of compressing data representing a 3D unit vector, and comprises the steps of:

> determining X, Y, and Z components of the vector;
>
> determining in which octant the vector falls;
>
> deriving octant pair data from signs of the X and Y components of the vector;
>
> deriving a scaling factor for the vector;
>
> scaling the X and Y components with the scaling factor; and
>
> deriving compressed data values to represent the vector and the octant of an octant pair in which the vector falls, with the vector being encoded as compressed data values and octant pair data.

(emphasis added).

B. The Reference of Dyer

In contrast to the invention called for by independent Claim 1, Dyer fails to disclose a method of compressing data representing a 3D unit vector that includes the steps of "determining in which octant the vector falls" and then "deriving octant pair data from signs of the X and Y components of the vector".

Instead, Dyer discloses a method of compressing and decompressing surface normals that utilizes, and indeed requires, the signs of all three components (X, Y and Z) of the 3D unit vector. Specifically, Dyer discloses a method of compressing surface normals that first requires the normals to be scaled to unit length in Cartesian coordinates. "Then, each of the smallest two vector components of the unit length normal is stored along with an indicator of which of the three vector components is not stored plus the algebraic sign of that vector component". (See Dyer, Abstract)

Specifically, in the method of Dyer, the vector component of the surface normal having the largest magnitude is identified. Then the two remaining vector components, representing the two smaller components of the vector, are "stored in a predefined order and in a memory space whose combined size is a preselected number of bytes less at least three bits, two bits of which is the number of bits necessary to store an indicator of the vector component not stored and one bit of which indicates the algebraic sign of that vector component". (See Dyer, 2:62-3:5)

Thus, for example, "if Z is the largest component of the surface normal, {X,Y} are stored in that order". Then, "if the preselected number of bytes is four (32 bits), each of the two stored vector components including the algebraic sign and exponent of that component is stored in 14 bits. At least two of the remaining bits are used to indicate which of the three vector components {X,Y,Z} is not stored, and an additional bit is used to store the sign of the vector component not stored." (See Dyer, 3:5-16) Upon decompression, the magnitude of the non-stored vector component Z is calculated on the basis of

the stored X and Y components, "with the sign of Z being determined from the sign bit which was stored as indicated above". (See Dyer, 3:25-32)

Accordingly, Dyer's method of compressing and decompressing surface normals requires the storing and use of data concerning the magnitude of two of the vector components {X,Y} of the normal, as well as data concerning the sign of all three vector components {X,Y,Z}.

In contrast to Dyer, amended Claim 1 calls for octant pair data to be derived from the signs of the X and Y components of the vector, with the vector ultimately being encoded as compressed data values and octant pair data. Accordingly, the method according to Claim 1 allows for the compression and storing of a unit vector without having to store and utilize the signs of all three components {X,Y,Z} of the vector. As a result, the claimed method requires less data storage space and bandwidth.

For the reasons set forth above, Applicant believes that independent Claim 1 and dependent Claim 4 traverse the prior rejection and are allowable over the cited reference of Dyer.

C. The Invention According to Independent Claim 5

The invention according to independent Claim 5, as amended, calls for an apparatus for compressing data representing a 3D unit vector, comprises:

> means for determining X, Y and Z components of the vector;
>
> means for determining in which octant of four octant pairs the vector falls;
>
> means for deriving octant pair data from signs of the X and Y components of the vector;
>
> means for deriving a scaling factor for the vector;
>
> means for scaling the X and Y components of the vector with the scaling factor; and
> means for deriving compressed data values to represent the vector and the octant of the octant pair in which the vector falls, with the

vector being encoded as compressed data values and octant pair data

(emphasis added).

As previously discussed with respect to Claim 1, Dyer discloses a method of compressing/decompressing surface normal vectors in which knowledge concerning the sign of all three components {X,Y,Z} of the vector is required. In contrast, independent Claim 5 calls for an apparatus capable of compressing unit vectors without storing and explicitly knowing the sign of the third Z component of the vector, instead including "means for deriving octant pair data from signs of the X and Y components of the vector".

Accordingly, for reasons similar to those discussed above with respect to Claim 1, Applicant believes that independent Claim 5 and dependent Claim 8 traverse the prior rejection and are allowable over the cited reference of Dyer.

D. The Invention According to Independent Claim 9

The invention according to independent Claim 9, as amended, calls for a method of decompressing data representing a 3D unit vector from compressed data comprising three fields, and comprises the steps of:

identifying one of four octant pairs from octant pair data stored in a first field;

extracting first and second data values from second and third fields;

determining from the first and second data values the octant of an identified octant pair in which the vector falls;

deriving X, Y and Z components from the first and second data values and the octant pair data; and

normalizing the X, Y, and Z components to derive a unit vector.

(emphasis added).

In contrast to the method of Claim 9, Dyer neither discloses nor suggests a method of decompressing unit vector data by "extracting first and second data values from second and third fields", "determining from the first and second data values the octant of an identified octant pair in which the vector falls", and then "deriving X, Y and Z components from the first and second data values and the octant pair data".

Instead, as previously discussed, Dyer discloses a method of compressing/decompressing surface normal vectors that requires the storing of data concerning the sign of all three components {X,Y,Z} of the vector. As such, Dyer does not "extract first and second data values from second and third fields" and subsequently use that data to derive the X,Y,Z components of the vector, but instead requires data values relating to all three fields (e.g., the sign of each of the three components of the vector). Accordingly, for reasons similar to above, Applicant believes that independent Claim 9 traverses the prior rejection and is allowable over the cited reference of Dyer.

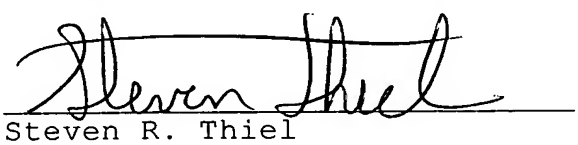
E. The Invention According to Independent Claim 10

Independent Claim 10 is an apparatus claim corresponding to the method called for in independent Claim 9. Accordingly, for the same reasons set forth above with respect to Claim 9, Applicant believes that independent Claim 10 traverses the prior rejection and is allowable over the cited reference of Dyer.

II. Conclusion

All objections and rejections having been addressed, it is respectfully submitted that the present application is in condition for allowance, and a Notice to that effect is earnestly solicited.

Respectfully submitted,



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